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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/608,281	06/27/2003	Daniel N. Harres	BO1-0186US	8539

74576 7590 11/24/2008
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EXAMINER	
LIU, LI	
ART UNIT	**PAPER NUMBER**
2613	

MAIL DATE	DELIVERY MODE
11/24/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/608,281	HARRES, DANIEL N.	
	Examiner	Art Unit	
	LI LIU	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 August 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,7-10,12-21,23-29,31-35,37-40,42 and 43* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *24* is/are allowed.

6)☒ Claim(s) *1-5,7-10,12-16,18-21,32-35,37-40,42 and 43* is/are rejected.

7)☒ Claim(s) *17,23,25-29 and 31* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 July 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 8/25/2008 has been entered.

Response to Arguments

2. Applicant's arguments with respect to claims 1, 16 and 32 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

3. Claims 17 and 25 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claims 17 and 25 recite the limitation of “wherein the transmitter includes an optical amplifier”; this limitation is the same as the limitation “the transmitter includes an optical amplifier” cited in claims 16 and 24 that the claims 17 and 25 depend from, respectively.

4. Claims 7, 20 and 25-29 are objected to because of the following informalities:

1). Claim 7, line 2, “to calculate a calculated noise” should be changed to “to calculate a noise”.

2). Claim 20, lines 2-3, “to calculate a calculated noise” should be changed to “to calculate a noise”.

3). Claim 28, line 2, “to calculate a calculated noise” should be changed to “to calculate a noise”.

4). Claims 25-29 and 31, line 1, “The vehicle” should be changed to “The aircraft”.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 1-5, 7-10 and 12-15 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 1, and thus depending claims 4-5, 7-10 and 12-15, recites the limitation “calculate a noise level of at least a portion of the electrical signal <u>before the electrical signal is amplified by an amplifier</u>”. However, according to the original disclosure, the

monitoring device is located after an amplifier (Figure 1, the monitoring device 140 is after the amplifier 132; Figure 5, the monitoring and control circuits are located after the amplifier 332; Figure 7, the monitoring device 440 is after the amplifier 410). In the specification, applicant mentions to monitor the electrical signal from the photodiode, but, the specification does not positively state that the monitoring component calculates a noise level of at least a portion of the electrical signal before the electrical signal is amplified by an amplifier. And the specification indicates that the control or monitoring loop is coupled between an output of the amplifier and an input voltage of the photodiode (page 4 lines 25-26). That is, although the specification states to monitor the electrical signal from the photodiode, a portion of the electrical signal or the entire electrical signal is passed through the amplifier, and then processed by the monitoring component. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 38, 40 and 43 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

1). Claim 38, and thus depending claim 40, recites the limitation "wherein monitoring a noise level of at least a portion of the electrical signal includes" in line 1

and 2. There is insufficient antecedent basis for this limitation in the claim. Claim 38 depends from claim 32, and claim 32 recites “calculating a noise level of at least a portion of the electrical signal”, not “monitoring a noise level of at least a portion of the electrical signal”.

2). Claim 43 recites the limitation "wherein monitoring a noise level of at least a portion of the electrical signal includes" in line 1 and 2. There is insufficient antecedent basis for this limitation in the claim. Claim 43 depends from claim 32, and claim 32 recites “calculating a noise level of at least a portion of the electrical signal”, not “monitoring a noise level of at least a portion of the electrical signal”.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 1-5, 7, 8 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnon et al (US 2002/0114038) in view of Nakano (US 6,795,675) and Traa (US 6,222,660) and Harres (US 6,128,112).

1). With regard to claim 1, Arnon et al discloses an apparatus (Figure 3), comprising:

a receiver (Avalanche Photodiode 150 in Figure 3) configured to receive an optical signal and to convert the optical signal to a corresponding electrical signal; and

a monitoring component (the Detector 154 and Controller 156 in Figure 3) to provide a feedback loop (e.g., Figure 3, the feedback loop 154 ->156 ->158 and then to 150) to increase a dynamic range of the receiver when an optical signal is high ([0010] and [0239], the system of Arnon shown in Figure 3 is used to increase the dynamic range of the receiver "so that the saturation of the APD, due to too high a level of the carrier or of the noise level, is prevent") without measuring a temperature of the surrounding environment of the receiver (in Arnon's system, no temperature controlling/monitoring devices are used), the monitoring component to:

calculate a noise level of at least a portion of the electrical signal (the monitoring signal is part of the electrical signal split from the output of amplifier 152, Figure 3; the gain of the APD is set according to the optical power level, the background noise level, and the aggregate noise, [0036] and [0237]-[0239]) and to adjust a gain of the receiver based on the noise level (page 10-11, [0237]-[0239], the gain of the APD is set according to the optical power level, the background noise level, and the aggregate noise).

But, Arnon does not expressly state: (A) to compare the noise level with a threshold value, the threshold value being at a point where a breakdown voltage of the receiver is eminent; and (B) wherein the monitoring component includes a condition determining component configured to determine at least one of a presence or an absence of light at the receiver; and (C) the noise level is calculated before an amplifier.

With regard to item (A), however, since Arnon teaches to calculate the noise level and use the calculation to control the gain of the APD, it is obvious that a reference

value or threshold is used in Arnon's system to make a decision to adjust the gain. For control purpose, a criterion must be used to judge the level of the signal/noise so to control the operation of the device being controlled. Another prior art, Nakano, discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/threshold to control the gain of the APD. And Nakano also teaches "[t]he alarm circuit 7 receives the noise detection signal 105, counts the noise pulses generated within a predetermined period, and outputs an alarm pulse 107 when the number of the counted noise pulses reaches a preset value. When the level of the optical signal input to the APD 2 is lowered or becomes zero, the APD 2 increases the amplification factor of the optical signal based on the control signal from the feedback control circuit 4". But, Nakano does not expressly disclose a "breakdown voltage". However, Traa, teaches a breakdown threshold of the avalanche photodiode (Figure 2, the point 48, where a breakdown voltage of the receiver is eminent, column 3, lines 17-21) so to control the bias voltage from the adaptive power supply.

Nakano discloses that the circuit for monitoring the optical signal level may be readily integrated and detect the reduction in the optical signal level or break in the optical signal with reliability" (column 5, line 59-65); and compared with other procedure, Nakano's circuit is not "complex" (column 1, line 46-48); and Traa discloses an optimum input voltage. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply a threshold value or breakdown threshold as taught by Nakano and Traa to the system of Arnon et al so that comparing the calculated noise level with a threshold value includes comparing the calculated noise

level with a breakdown threshold of the avalanche photodiode; and then the gain of the APD can be better controlled and the signal quality can be improved and the system can be made more reliable.

With regard to item (B), however, Harres discloses a condition determining component configured to determine at least one of a presence or an absence of light at the receiver (column 3 line 2-33, and Figure 3), the condition determining component determines the states of the signal: high state and low state; and power determining means for determining the power of the respective noise portions of the two phase segments.

Harres provides a reliable detection and decoding method even at low power levels. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the condition determining component as taught by Harres to the system of Arnon et al and Nakano and Traa so that the gain of the APD can be better controlled and the signal quality and reliability can be improved.

With regard to item (C), although Arnon et al and Nakano and Traa and Harres do not specifically disclose to calculate a noise level of at least a portion of the electrical signal before the electrical signal is amplified by an amplifier, such limitation are merely a matter of design choice and would have been obvious in the system of Arnon et al. Arnon et al and Nakano and Traa and Harres teach that the electrical signal is monitored and noise level is calculated, and then feedback control is used to adjust the input voltage of the APD. The limitations in claim 1 do not define a patentably distinct invention over that in Arnon et al and Nakano and Traa and Harres since both the

invention as a whole and Arnon et al and Nakano and Traa and Harres are directed to monitor the electrical signal and calculate the noise level and adjust the input voltage of the APD. To monitor the electrical signal just before the amplifier or after the amplifier is inconsequential for the invention as a whole and presents no new or unexpected results, so long as the electrical signal is successfully monitored. Therefore, to calculate the noise level before an amplifier in Arnon et al and Nakano and Traa and Harres would have been a matter of obvious design choice to one of ordinary skill in the art.

2). With regard to claim 2, Arnon et al and Nakano and Tarr abd Harres disclose all of the subject matter as applied to claim 1 above. And Arnon et al further discloses a transmitter (e.g., Figure 4, the emitter 52) configured to transmit the optical signal to the receiver.

3). With regard to claim 3, Arnon et al and Nakano and Tarr and Harres disclose all of the subject matter as applied to claim 1 above. And Arnon et al further discloses wherein the monitoring component is further configured to adjust an amplification of the transmitter (the Power Attenuator 49 sets a power output of emitter 52 in Figure 4) based on the noise level (page 11, [0241]-[0243]).

4). With regard to claim 4, Arnon et al and Nakano and Harres disclose all of the subject matter as applied to claim 1 above. And Arnon et al further discloses wherein the receiver includes a photodiode (Figure 3, the Avalanche Photodiode 150).

5). With regard to claim 5, Arnon et al and Nakano and Tarr and Harres discloses all of the subject matter as applied to claim 1 above. And Arnon et al and Nakano and

Tarr and Harres further disclose wherein the monitoring component is configured to monitor an output voltage of the electrical signal and to adjust at least one of an amplification of the transmitter (Figures 2-5 and 12 etc, [0237]-[0239], [0241] and [0268] etc., the feedback signal is sent to the transmitter to adjust the power level of the transmitter) and a gain of the receiver to maintain a desired RMS level of a electrical signal (Harres: column 10, line 11-28).

6). With regard to claim 7, Arnon et al and Nakano and Tarr and Harres disclose all of the subject matter as applied to claim 1 above. And Arnon et al further discloses wherein the monitoring component includes a noise energy calculation component configured to calculate a noise level of at least a portion of the electrical signal (Figure 3, page 10-11, [0237]-[0239], the electrical signal is tapped out, and the noise level and aggregate noise are calculated).

7). With regard to claim 8, Arnon et al and Nakano and Tarr and Harres disclose all of the subject matter as applied to claims 1 and 7 above. And Arnon et al and Nakano and Tarr and Harres et al discloses wherein the noise energy calculation component includes an integrate-and-dump circuit that integrates an energy value over a bit interval (Harres: column 7, line 3-23, and Figure 3).

8). With regard to claim 12, Arnon et al and Nakano and Tarr and Harres disclose all of the subject matter as applied to claim 1 above. Arnon et al and Nakano and Tarr and Harres further disclose wherein the monitoring component includes a state means calculation component configured to compute at least one of a high state means and a low state means of the electrical signal (Harres: column 3 line 2-33, and Figure 3, power

determining means for determining the power of the respective noise portions of the two phase segments).

11. Claims 32-35, 37-39 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnon et al (US 2002/0114038) in view of Nakano (US 6,795,675) and Traa (US 6,222,660) and Harres (US 6,128,112) and Saunders (US 6,259,542).

1). With regard to claim 32, Arnon et al disclose a method of controlling an output of an optical system, comprising:

receiving an optical signal with a receiver (Avalanche Photodiode 150 receives optical signal, Figure 3);

converting the optical signal to a corresponding electrical signal (Avalanche Photodiode 150 converts optical signal into an electrical signal, Figure 3);

providing a feedback loop (e.g., Figure 3, the feedback loop 154 ->156 ->158 and then to 150) to increase a dynamic range of the receiver when an optical signal is high ([0010] and [0239], the system of Arnon shown in Figure 3 is used to increase the dynamic range of the receiver "so that the saturation of the APD, due to too high a level of the carrier or of the noise level, is prevent") without measuring a temperature of the surrounding environment of the receiver (in Arnon's system, no temperature controlling/monitoring devices are used) by:

calculating (the Detector 154 and Controller 156 in Figure 3; the gain of the APD is set according to the optical power level, the background noise level, and the aggregate noise, page 10-11, [0237]-[0239]) a noise level of at least a portion of the electrical signal; and

adjusting at least one of an amplification of the optical signal and a gain of the receiver based on the noise level (page 10-11, [0237]-[0239], the gain of the APD is set according to the optical power level, the background noise level, and the aggregate noise).

But, Arnon does not expressly state: (A) to compare the noise level with a threshold value, the threshold value being at a point where a breakdown voltage of the receiver is eminent; and (B) wherein calculating the noise includes: a high energy calculation component configured to compute an average energy for the high-state A; a low energy calculation component configured to compute an average energy for the low-state -A; and a comparator configured to compare a ratio of the average energies for the high- and low-states A, -A with a predetermined threshold.

With regard to item (A), however, since Arnon teaches to calculate the noise level and use the calculation to control the gain of the APD, it is obvious that a reference value or threshold is used in Arnon's system to make a decision to adjust the gain. For control purpose, a criterion must be used to judge the level of the signal/noise so to control the operation of the device being controlled. Another prior art, Nakano, discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/threshold to control the gain of the APD. And Nakano also teaches "[t]he alarm circuit 7 receives the noise detection signal 105, counts the noise pulses generated within a predetermined period, and outputs an alarm pulse 107 when the number of the counted noise pulses reaches a preset value. When the level of the optical signal input to the APD 2 is lowered or becomes zero, the APD 2 increases the amplification factor of the optical

signal based on the control signal from the feedback control circuit 4". But, Nakano does not expressly disclose a "breakdown voltage". However, Traa, teaches a breakdown threshold of the avalanche photodiode (Figure 2, the point 48, where a breakdown voltage of the receiver is eminent, column 3, lines 17-21) so to control the bias voltage from the adaptive power supply.

Nakano discloses that the circuit for monitoring the optical signal level may be readily integrated and detect the reduction in the optical signal level or break in the optical signal with reliability" (column 5, line 59-65); and compared with other procedure, Nakano's circuit is not "complex" (column 1, line 46-48); and Traa discloses an optimum input voltage. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply a threshold value or breakdown threshold as taught by Nakano and Traa to the system of Arnon et al so that comparing the calculated noise level with a threshold value includes comparing the calculated noise level with a breakdown threshold of the avalanche photodiode; and then the gain of the APD can be better controlled and the signal quality can be improved and the system can be made more reliable.

With regard to item (B), however, Harres discloses a high energy calculation component configured to compute average energys for the high-state and low state (column 3 line 2-33), and power determining means for determining the power of the respective noise portions of the two phase segments (Figure 3). And Harres teaches that the signal-to-noise ratio is used for calculating weight factor. And another prior art, Saunders uses a ratio between a detected energy level of a soliton pulses and a

detected energy level of the dispersive wave for controlling the gain of an amplifier (Figures 3 and 4, column 5, line 48-58, column 6 line 26-37, and column 7, line 31-49). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the ratio of the average energies for the high- and low-states to control the gain of the APD.

And Arnon and Nakano and Traa disclose a feedback control circuit which uses a reference voltage/or predetermined threshold to control the gain of the APD. Harres provides a reliable detection and decoding method even at low power levels. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the ratio of the energy states and a comparator and a predetermined threshold as taught by Harres and Saunders to the system of Arnon et al and Nakano and Traa so that the gain of the APD can be better controlled and the signal quality and reliability can be improved.

2). With regard to claim 33, Arnon et al and Nakano and Traa and Harres and Saunders disclose all of the subject matter as applied to claim 32 above. And Arnon et al further discloses the method further including transmitting (e.g., Figure 4, the emitter 52) the optical signal to the receiver (Figure 4).

3). With regard to claim 34, Arnon et al and Nakano and Traa and Saunders disclose all of the subject matter as applied to claim 32 above. And Arnon et al further discloses wherein receiving an optical signal with a receiver includes receiving an optical signal with a photodiode (Figure 3, the Avalanche Photodiode 150).

4). With regard to claim 35, Arnon et al and Nakano and Traa and Harres and Saunders discloses all of the subject matter as applied to claim 32 above. And Arnon et al and Nakano and Traa and Harres and Saunders further disclose wherein the monitoring component is configured to monitor an output voltage of the electrical signal and to adjust at least one of an amplification of the transmitter (Figures 2-5 and 12 etc, [0237]-[0239], [0241] and [0268] etc., the feedback signal is sent to the transmitter to adjust the power level of the transmitter) and a gain of the receiver to maintain a desired RMS level of a electrical signal (Harres: column 10, line 11-28).

5). With regard to claim 37, Arnon et al and Nakano and Traa and Harres and Saunders discloses all of the subject matter as applied to claim 32 above. And Arnon et al further discloses wherein receiving an optical signal with a receiver includes receiving an optical signal with an avalanche photodiode (Figure 3, APD 158), and wherein comparing the calculated noise level with a threshold value includes comparing the calculated noise level with a breakdown threshold of the avalanche photodiode (Harres: Figure 2, e.g., the point 48, column 3, line 17-21).

6). With regard to claim 38, Arnon et al and Nakano and Traa and Saunders disclose all of the subject matter as applied to claim 32 above. And Arnon et al further discloses wherein monitoring a noise level of at least a portion of the electrical signal includes calculating a noise energy level of at least a portion of the electrical signal (page 10-11, [0237]-[0239], the electrical signal is tapped out, the noise level and aggregate noise are calculated).

7). With regard to claim 39, Arnon et al and Nakano and Traa and Harres and Saunders disclose all of the subject matter as applied to claims 32 and 38 above. And Arnon et al and Nakano and Harres et al and Saunders further discloses wherein the noise energy calculation component includes an integrate-and-dump circuit that integrates an energy value over a bit interval (Harres: column 7, line 3-23, and Figure 3).

8). With regard to claim 42, Arnon et al and Nakano and Traa and Harres and Saunders disclose all of the subject matter as applied to claim 32 above. And Arnon et al disclose wherein the monitoring component is configured to reduce at least one of an amplification of the transmitter and a gain of the receiver (page 10-11, [0237]-[0239], the gain of the APD is set according to the optical power level, the background noise level, and the aggregate noise).

Arnon et al does not expressly disclose the gain is adjusted when a ratio of an average energy of a high-state A of the electrical signal and an average energy of a low-state A of the electrical signal is greater than a predetermined threshold.

However, Harres discloses a high energy calculation component configured to compute average energies for the high-state and low state (column 3 line 2-33), and power determining means for determining the power of the respective noise portions of the two phase segments (Figure 3). And Harres teaches that the signal-to-noise ratio is used for calculating weight factor. And Saunders uses a ratio between a detected energy level of a soliton pulses and a detected energy level of the dispersive wave for controlling the gain of an amplifier (Figures 3 and 4, column 5, line 48-58, column 6 line

26-37, and column 7, line 31-49). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the ratio of the average energies for the high- and low-states to control the gain of the APD.

And Arnon and Nakano and Traa discloses a feedback control circuit which uses a reference voltage/or predetermined threshold to control the gain of the APD. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the ratio of the energy states and a comparator and a predetermined threshold as taught by Harres and Saunders to the system of Arnon et al and Nakano and Traa so that the gain is adjusted when a ratio of an average energy of a high-state of the electrical signal and an average energy of a low-state of the electrical signal is greater than a predetermined threshold, and then the gain of the APD can be better controlled and the signal quality can be improved.

12. Claims 16 and 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnon et al (US 2002/0114038) in view of Tomooka et al (US 6,266,169) and Harres (US 6,128,112) and Saunders (US 6,259,542) and Nakano (US 6,795,675) and Traa (US 6,222,660).

1). With regard to claim 16, Arnon et al discloses an optical system, comprising:

a transmitter (e.g., Figure 4, the emitter 52) configured to transmit an optical signal;

a receiver (Avalanche Photodiode 150 in Figure 3) configured to receive the optical signal and to output an electrical signal; and

a monitoring component (the Detector 154 and Controller 156 in Figure 3) to provide a feedback loop (e.g., Figure 3, the feedback loop 154 ->156 ->158 and then to 150) to increase a dynamic range of the receiver when an optical signal is high ([0010] and [0239], the system of Arnon shown in Figure 3 is used to increase the dynamic range of the receiver "so that the saturation of the APD, due to too high a level of the carrier or of the noise level, is prevent") without measuring a temperature of the surrounding environment of the receiver (in Arnon's system, no temperature controlling/monitoring devices are used), the monitoring component to:

monitor a noise level of at least a portion of the electrical signal (the monitoring signal is part of the electrical signal split from the output of amplifier 152, Figure 3) and to adjust at least one of an amplification of the transmitter and a gain of the receiver based on the noise level (page 10-11, [0237]-[0239], the gain of the APD is set according to the optical power level, the background noise level, and the aggregate noise).

Arnon et al disclose wherein the monitoring component is configured to reduce at least one of an amplification of the transmitter and a gain of the receiver (page 10-11, [0237]-[0239], the gain of the APD is set according to the optical power level, the background noise level, and the aggregate noise).

But, Arnon et al does not expressly disclose: (A) the transmitter include a optical amplifier; (B) reduce at least one of an optical amplification of the transmitter and a gain of the receiver when a ratio of an average energy of a high-state A of the electrical signal and an average energy of a low-state A of the electrical signal is greater than a

predetermined threshold, the threshold value being at a point where a breakdown voltage of the receiver is eminent.

With regard to item (A), Tomooka et al discloses a transmitter including an optical amplifier (e.g., Figure 1, the optical amplifier 14). The optical amplifier is a well known device in the optical communications, Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a optical amplifier in the system of Arnon et al so that the required input optical power can be obtained, and noise can be better controlled and the signal quality can be improved.

With regard to item (B), however, Harres discloses a high energy calculation component configured to compute average energies for the high-state and low state (column 3 line 2-33), and power determining means for determining the power of the respective noise portions of the two phase segments (Figure 3). And Harres teaches that the signal-to-noise ratio is used for calculating weight factor. And another prior art, Saunders uses a ratio between a detected energy level of a soliton pulses and a detected energy level of the dispersive wave for controlling the gain of an amplifier (Figures 3 and 4, column 5, line 48-58, column 6 line 26-37, and column 7, line 31-49); and a reference value or threshold is used in Saunders' system to make decision as to whether the control device should be activated (column 9, line 26-37). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the ratio of the average energies for the high- and low-states to control the gain of the APD.

And Nakano discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/or predetermined threshold to control the gain of the APD. But, Harres and Nakano do not expressly disclose a “breakdown voltage”. However, Traa, teaches a breakdown threshold of the avalanche photodiode (Figure 2, e.g., the point 48, where a breakdown voltage of the receiver is eminent, column 3, lines 17-21) so to control the bias voltage from the adaptive power supply.

Nakano discloses that the circuit for monitoring the optical signal level may be readily integrated and detect the reduction in the optical signal level or break in the optical signal with reliability” (column 5, line 59-65); and compared with other procedure, Nakano's circuit is not “complex” (column 1, line 46-48). Harres provide a more reliable method and apparatus for detecting and decoding digital signals; and “[i]t is a further object of the invention to provide a method and apparatus for reliably detecting low level signals by increasing the gain of the detector without unduly increasing the bit error rate”; and Traa discloses an optimum input voltage.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the ratio of the energy states and a comparator and a predetermined threshold as taught by Harres and Saunders and Nakano and Traa to the system of Arnon et al and Tomooka et al so that the gain is adjusted when a ratio of an average energy of a high-state of the electrical signal and an average energy of a low-state of the electrical signal is greater than a predetermined threshold, and then the gain of the APD can be better controlled and the signal quality and reliability can be improved.

2). With regard to claim 18, Arnon et al and Tomooka et al and Harres and Saunders and Nakano and Traa disclose all of the subject matter as applied to claim 16 above. And Arnon et al further discloses wherein the receiver includes an avalanche photodiode (Figure 3, the Avalanche Photodiode 150).

3). With regard to claim 19, Arnon et al and Tomooka et al and Harres and Saunders and Nakano and Traa disclose all of the subject matter as applied to claim 16 above. And Arnon et al further disclose wherein the monitoring component is configured to monitor an output voltage of the electrical signal and to adjust at least one of an amplification of the transmitter (Figures 2-5 and 12 etc, [0237]-[0239], [0241] and [0268] etc., the feedback signal is sent to the transmitter to adjust the power level of the transmitter) and a gain of the receiver to maintain a desired RMS level of a electrical signal (Harres: column 10, line 11-28).

4). With regard to claim 20, Arnon et al and Tomooka et al and Harres and Saunders and Nakano and Traa disclose all of the subject matter as applied to claim 16 above. And Arnon et al further discloses wherein the monitoring component includes a noise energy calculation component configured to calculate a calculated noise level of at least a portion of the electrical signal (Figure 3, page 10-11, [0237]-[0239], the electrical signal is tapped out, and the noise level and aggregate noise are calculated).

5). With regard to claim 21, Arnon et al and Tomooka et al and Harres and Saunders and Nakano and Traa disclose all of the subject matter as applied to claim 16 above. But, Arnon et al does not expressly disclose wherein the monitoring component includes: a high energy calculation component configured to compute an average

energy for the high-state A; a low energy calculation component configured to compute an average energy for the low-state -A; and a comparator configured to compare a ratio of the average energies for the high- and low-states A, -A with a predetermined threshold.

However, Harres discloses a high energy calculation component configured to compute average energys for the high-state and low state (column 3 line 2-33), and power determining means for determining the power of the respective noise portions of the two phase segments (Figure 3). And Harres teaches that the signal-to-noise ratio is used for calculating weight factor. And Saunders uses a ratio between a detected energy level of a soliton pulses and a detected energy level of the dispersive wave for controlling the gain of an amplifier (Figures 3 and 4, column 5, line 48-58, column 6 line 26-37, and column 7, line 31-49). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the ratio of the average energies for the high- and low-states to control the gain of the APD.

And Nakano discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/or predetermined threshold to control the gain of the APD.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the ratio of the energy states and a comparator and a predetermined threshold as taught by Harres and Saunders and Nakano to the system of Arnon et al so that the gain of the APD can be better controlled and the signal quality can be improved.

13. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnon et al and Nakano and Traa and Harres as applied to claim 1 above, and in further view of Saunders (US 6,259,542).

1). With regard to claim 13, Arnon et al and Nakano and Traa and Harres disclose all of the subject matter as applied to claim 1 above. But, Arnon et al does not expressly disclose wherein the monitoring component includes: a high energy calculation component configured to compute an average energy for the high-state A; a low energy calculation component configured to compute an average energy for the low-state -A; and a comparator configured to compare a ratio of the average energies for the high- and low-states A, -A with a predetermined threshold.

However, Harres discloses a high energy calculation component configured to compute average energys for the high-state and low state (column 3 line 2-33), and power determining means for determining the power of the respective noise portions of the two phase segments (Figure 3). And Harres teaches that the signal-to-noise ratio is used for calculating weight factor.

And another prior art, Saunders uses a ratio between a detected energy level of a soliton pulses and a detected energy level of the dispersive wave for controlling the gain of an amplifier (Figures 3 and 4, column 5, line 48-58, column 6 line 26-37, and column 7, line 31-49). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the ratio of the average energies for the high- and low-states to control the gain of the APD.

And Nakano discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/or predetermined threshold to control the gain of the APD.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the ratio of the energy states and a comparator and a predetermined threshold as taught by Harres and Saunders and Nakano to the system of Arnon et al so that the gain of the APD can be better controlled and the signal quality and reliability can be improved.

2). With regard to claim 14, Arnon et al and Traa and Nakano and Harres disclose all of the subject matter as applied to claim 1 above. And Arnon et al disclose wherein the monitoring component is configured to reduce at least one of an amplification of the transmitter and a gain of the receiver (page 10-11, [0237]-[0239], the gain of the APD is set according to the optical power level, the background noise level, and the aggregate noise).

Arnon et al does not expressly disclose the gain is adjusted when a ratio of an average energy of a high-state A of the electrical signal and an average energy of a low-state A of the electrical signal is greater than a predetermined threshold.

However, Harres discloses a high energy calculation component configured to compute average energys for the high-state and low state (column 3 line 2-33), and power determining means for determining the power of the respective noise portions of the two phase segments (Figure 3). And Harres teaches that the signal-to-noise ratio is used for calculating weight factor.

Another prior art, Saunders uses a ratio between a detected energy level of a soliton pulses and a detected energy level of the dispersive wave for controlling the gain of an amplifier (Figures 3 and 4, column 5, line 48-58, column 6 line 26-37, and column 7, line 31-49). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the ratio of the average energies for the high- and low-states to control the gain of the APD.

And Nakano discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/or predetermined threshold to control the gain of the APD.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the ratio of the energy states and a comparator and a predetermined threshold as taught by Harres and Saunders and Nakano to the system of Arnon et al so that the gain is adjusted when a ratio of an average energy of a high-state of the electrical signal and an average energy of a low-state of the electrical signal is greater than a predetermined threshold, and then the gain of the APD can be better controlled and the signal quality and reliability can be improved.

Allowable Subject Matter

14. Claim 24 is allowed.

15. Claim 23 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

16. Claims 40 and 43 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LI LIU whose telephone number is (571)270-1084. The examiner can normally be reached on Mon-Fri, 8:00 am - 5:30 pm, alternating Fri off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Vanderpuye can be reached on (571)272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/L. L./

Examiner, Art Unit 2613
November 11, 2008

/Kenneth N Vanderpuye/
Supervisory Patent Examiner, Art Unit 2613